Traffic Noise Analysis Report

Bentsen Road Widening

0921-02-512
Pharr

October/2025

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 17, 2025, and executed by FHWA and TxDOT.

Table of Contents

Introduction 3
Analysis 4
Validation 5
Results 5
Abatement Analysis 7
Proposed Abatement 7
Noise Contours for Land Use Planning 8
Construction Noise 9
Local Official Notification and Date of Public Knowledge Statement 9
List of Attachments 9

The proposed project will widen the existing two-lane Bentsen Road from an average of an 80-ft right-of-way (ROW) to a 100-ft ROW major collector, requiring new ROW. As shown in **Attachment A, Figure 1**, the proposed 65-ft wide typical section roadway will include the addition of two northbound lanes, two southbound lanes, and a continuous left turn lane, with curb, gutter, and an underground drainage system. The proposed project will include a 2-to-1 elliptical roundabout at the intersection of Mile 4 and Bentsen Road.

The proposed project will increase the capacity of traffic by addition of through-traffic lanes along Bentsen Road which would decrease the distance between travel lanes and adjacent noise receivers, triggering a Type I project.

Introduction

This analysis was accomplished in accordance with TxDOT's (Federal Highway Administration (FHWA)-approved) Traffic Noise Policy (2019).

Sound from highway traffic is generated primarily from a vehicle's tires, engine and exhaust. It is commonly measured in decibels and is expressed as "dB."

Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dB(A)."

Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "Leq."

The traffic noise analysis typically includes the following elements:

- Identification of land use activity areas that might be impacted by traffic noise.
- Determination of existing noise levels.
- Prediction of future noise levels.
- Identification of possible noise impacts.
- Consideration and evaluation of measures to reduce noise impacts.

The FHWA has established the following Noise Abatement Criteria (NAC) for various land use activity areas that are used as one of two means to determine when a traffic noise impact would occur.

Table 1. FHWA Noise Abatement Criteria (NAC)

Activity Category	FHWA (dB(A) Leq)	Description of Land Use Activity Areas
A	57 (exterior)	Lands on which serenity and quiet are of extra-ordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Residential

Activity Category	FHWA (dB(A) Leq)	Description of Land Use Activity Areas
C	67 (exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E	72 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F.
F	--	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	Undeveloped lands that are not permitted.

A noise impact occurs when either the absolute or relative criterion is met:

Absolute criterion - The predicted noise level at a receptor approaches, equals, or exceeds the NAC. "Approach" is defined as one dB(A) below the NAC. For example: a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dB(A) or above.

Relative criterion - The predicted noise level substantially exceeds the existing noise level at a receptor even though the predicted noise level does not approach, equal or exceed the NAC. “Substantially exceeds” is defined as more than 10 dB(A). For example: a noise impact would occur at a Category B residence if the existing level is 54 dB(A) and the predicted level is 65 dB(A).

When a traffic noise impact occurs, noise abatement measures must be considered. A noise abatement measure is any positive action taken to reduce the impact of traffic noise on an activity area.

Analysis

The FHWA traffic noise modeling software (TNM 2.5) was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type and speed of vehicles; highway alignment and grade; cuts, fills and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise.

The approved traffic data used in this analysis is included in **Attachment B**.

The traffic data provided utilized directional distribution percentages with a difference greater than 10%. As such, traffic noise data was modeled in two sets with 61% of the traffic in the first model traveling north and then in the second model traveling south. The higher noise levels of the two runs by receiver location were reported in the results (**Table 2**).

Validation

A validation study was performed in order to ensure that traffic noise is the main source of noise and to verify that the existing model accurately predicts existing traffic noise based on current conditions. Model validation compares field-collected sound level measurements to traffic noise levels calculated in an existing condition model that used field-collected traffic parameters. Differences between the measured and calculated levels for this project were within the +/- 3 dB(A) tolerance allowed by FHWA. Therefore, the existing noise model is considered validated for this project. Additional information on the validation study is included in **Attachment C.**

Results

Existing and predicted traffic noise levels were modeled at receiver locations (**Table 2** and **Attachment A, Figure 1**) that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement.

Table 2. Traffic Noise Levels dB(A) Leq

Representative Receiver	NAC Category	NAC Level	Existing	Predicted 2048	Change (+/-)	Noise Impact (Yes/No)
R-01 – Place of Worship	NAC D	51 (Interior)	36[1]	38[1]	2	**No**
R-02 – Outdoor Recreation Facility	NAC C	66	45	49	4	**No**
R-03 – Residential	NAC B	66	52	55	3	**No**
R-04 – Residential	NAC B	66	48	52	4	**No**
R-05 – Residential	NAC B	66	57	61	4	**No**
R-06 – Residential	NAC B	66	48	52	4	**No**
R-07 – Residential	NAC B	66	63	65	2	**No**
R-08 – Residential	NAC B	66	63	66	3	**No**
R-09 – Residential	NAC B	66	63	64	1	**No**
R-10 – Residential	NAC B	66	58	60	+2	**No**
R-11 – Residential	NAC B	66	59	61	+2	**No**
R-12 – Residential	NAC B	66	63	64	+1	**No**
R-13 – Residential	NAC B	66	62	63	+1	**No**
R-14 – Residential	NAC B	66	57	59	+2	**No**
R-15 – Residential	NAC B	66	62	62	0	**No**

Representative Receiver	NAC Category	NAC Level	Existing	Predicted 2048	Change (+/-)	Noise Impact (Yes/No)
R-16 – Residential	NAC B	66	54	56	+2	**No**
R-17 – Playground	NAC C	66	51	53	+2	**No**
R-18 – Place of Worship	NAC D	51 (Interior)	24[1]	27[1]	+3	**No**
R-19 – Place of Worship	NAC D	51 (Interior)	34[1]	37[1]	+3	**No**
R-20 – Residential	NAC B	66	62	64	+2	**No**
R-21 – Residential	NAC B	66	62	64	+2	**No**
R-22 – Residential	NAC B	66	65	63	-2	**No**
R-23 – Residential	NAC B	66	60	59	-1	**No**
R-24 – Residential	NAC B	66	59	63	+4	**No**
R-25 – Residential	NAC B	66	63	67	+4	**Yes**
R-26 – Residential	NAC B	66	61	63	+2	**No**
R-27 – Residential	NAC B	66	57	59	+2	**No**
R-28 – Residential	NAC B	66	65	69	+4	**Yes**
R-29 – Residential	NAC B	66	65	68	+3	**Yes**
R-30 – Residential	NAC B	66	56	60	+4	**No**
R-31 – Residential	NAC B	66	64	66	+2	**Yes**
R-32 – Residential	NAC B	66	62	66	+4	**Yes**
R-33 – Residential	NAC B	66	60	63	+3	**No**
R-34 – Residential	NAC B	66	59	61	+2	**No**

Key: [1] Interior building noise reducing factors were calculated to be -25dB(A); structures were observed as masonry buildings and windows were assumed to be single glazed.

As indicated in **Table 2**, the proposed project would result in a traffic noise impact at one or more representative receiver locations.

Noise abatement measures were considered for each location with predicted noise impacts.

Abatement Analysis

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. Feasibility and reasonableness considerations include constructability, the predicted acoustic reductions provided by an abatement measure, a cost allowance, and whether the adjacent receptors desire abatement. Receptors associated with an abatement measure that achieve a noise reduction of five dB(A) or greater are called benefited receptors.

In order to be "feasible," the abatement measure must benefit a minimum of two impacted receptors AND reduce the predicted noise level by at least five dB(A) at greater than 50% of first-row impacted receptors.

In order to be "reasonable," the abatement measure must also reduce the predicted noise level by at least seven dB(A) for at least one benefited receptor (noise reduction design goal) and not exceed the standard barrier cost of 1,500 square feet per benefited receptor. In addition, an abatement measure may not be reasonable if the construction costs are unreasonably high due to site constraints, as determined through an alternate barrier cost assessment.

The following noise abatement measures were considered: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone, and the construction of noise barriers.

Traffic management – Control devices could be used to reduce the speed of the traffic; however, the minor benefit of one dB(A) per five mph reduction in speed does not outweigh the associated increase in congestion and air pollution. Other measures such as time or use restrictions for certain vehicles are prohibited on state highways.

Alteration of horizontal and/or vertical alignments – Any alteration of the existing alignment would displace existing businesses and residences, require additional right of way and not be cost effective/reasonable.

Buffer zone – The acquisition of undeveloped property to act as a buffer zone is designed to avoid rather than abate traffic noise impacts and, therefore, is not feasible.

Noise barriers – Noise barriers in the form of noise walls are the most commonly used noise abatement measures and were considered for this project.

Noise barriers would not be feasible and reasonable for any of the following impacted receptors, and therefore, are not proposed for incorporation into the project:

> **R-32** - This receiver represents one impacted residence within a neighborhood. Adjacent first-row receivers within the neighborhood were determined to be non-impacted. Because a noise abatement measure must potentially benefit a minimum of two impacted receptors, noise abatement for this location is not feasible.

Proposed Abatement

Noise barriers would be feasible and reasonable for the following impacted receptors, and therefore, are proposed for incorporation into the project (**Table 3**).

> **R-22** and **R-25** - This receiver represents 13 residences in Tiffaney Estates with backyards that face the roadway. Twelve of the first-row receptors have predicted traffic noise impacts. A continuous noise barrier would block access to the neighborhood, therefore a barrier in two sections was modeled. Based on preliminary calculations, a noise barrier approximately 1,222 feet in total length and 6 feet in height would reduce noise levels by at least 5 dB(A) for 11 first-row impacted receptors and meet the noise

reduction design goal of 7 dB(A) for eight of those receptors. With a total area of abatement of 7,332 square feet, or 666 feet per equivalent benefited receptor, the barrier would be cost reasonable.

R-28 - This receiver represents 15 residences in Blossom Ridge with backyards that face the roadway. Fourteen of the first-row receptors have predicted traffic noise impacts. A continuous noise barrier would block access to the neighborhood, therefore a barrier in two sections was modeled. Based on preliminary calculations, a noise barrier approximately 869 feet in total length and 5 feet in height would reduce noise levels by at least 5 dB(A) for 14 first-row impacted receptors and meet the noise reduction design goal of 7 dB(A) for five of those receptors. With a total area of abatement of 4,345 square feet, or 310 feet per equivalent benefited receptor, the barrier would be cost reasonable.

R-29 and **R-31** - These receivers represent 11 residences in Villa Espanola Estates with backyards that face the roadway. Eight of the first-row receptors have predicted traffic noise impacts. A continuous noise barrier would block access to the neighborhood, therefore a barrier in five sections was modeled. Based on preliminary calculations, a noise barrier approximately 1,156 feet in total length and 6 feet in height would reduce noise levels by at least 5 dB(A) for five first-row impacted receptors and meet the noise reduction design goal of 7 dB(A) for two of those receptors. With a total area of abatement of 6,935 square feet, or 1,387 feet per equivalent benefited receptor, the barrier would be cost reasonable.

Table 3. Noise Barrier Proposal (preliminary)

Barrier	Representative Receivers	Total # Benefited	Length (feet)	Height (feet)	Total Sq. Ft.	Sq. Ft. per Benefited Receptor
NB-01	R-22 and R-25	11	1,222	6	7,332	666
NB-02	R-28	14	869	5	4,345	310
NB-03	R-29 and R-31	5	1,156	6	6,935	1,387

Any subsequent project design changes may require a reevaluation of this preliminary noise barrier proposal. The final decision to construct the proposed noise barrier will not be made until completion of the project design, utility evaluation, and polling of all benefited and adjacent property owners and residents.

Noise Contours for Land Use Planning

To avoid noise impacts that may result from future development of properties adjacent to the project, local officials responsible for land use control programs must ensure, to the maximum extent possible, that no new activities are planned or constructed along or within the following predicted (2048) noise impact contours. Noise impact contours were predicted separately for Bentsen Road – Section 1 and Bentsen Road – Section 2 (**Table 4**), described in **Attachment B**.

Table 4. Noise Impact Contours

Road Section	Land Use	Impact Contour	Distance from Right of Way
Bensten Road – Section 1	NAC category B & C	66 dB(A)	Within the ROW
	NAC category E	71 dB(A)	0 feet
Bensten Road – Section 2	NAC category B & C	66 dB(A)	Within the ROW
	NAC category E	71 dB(A)	30 feet

Construction Noise

Noise associated with the construction of the project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable. None of the receptors is expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities is not expected. Provisions will be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

Local Official Notification and Date of Public Knowledge Statement

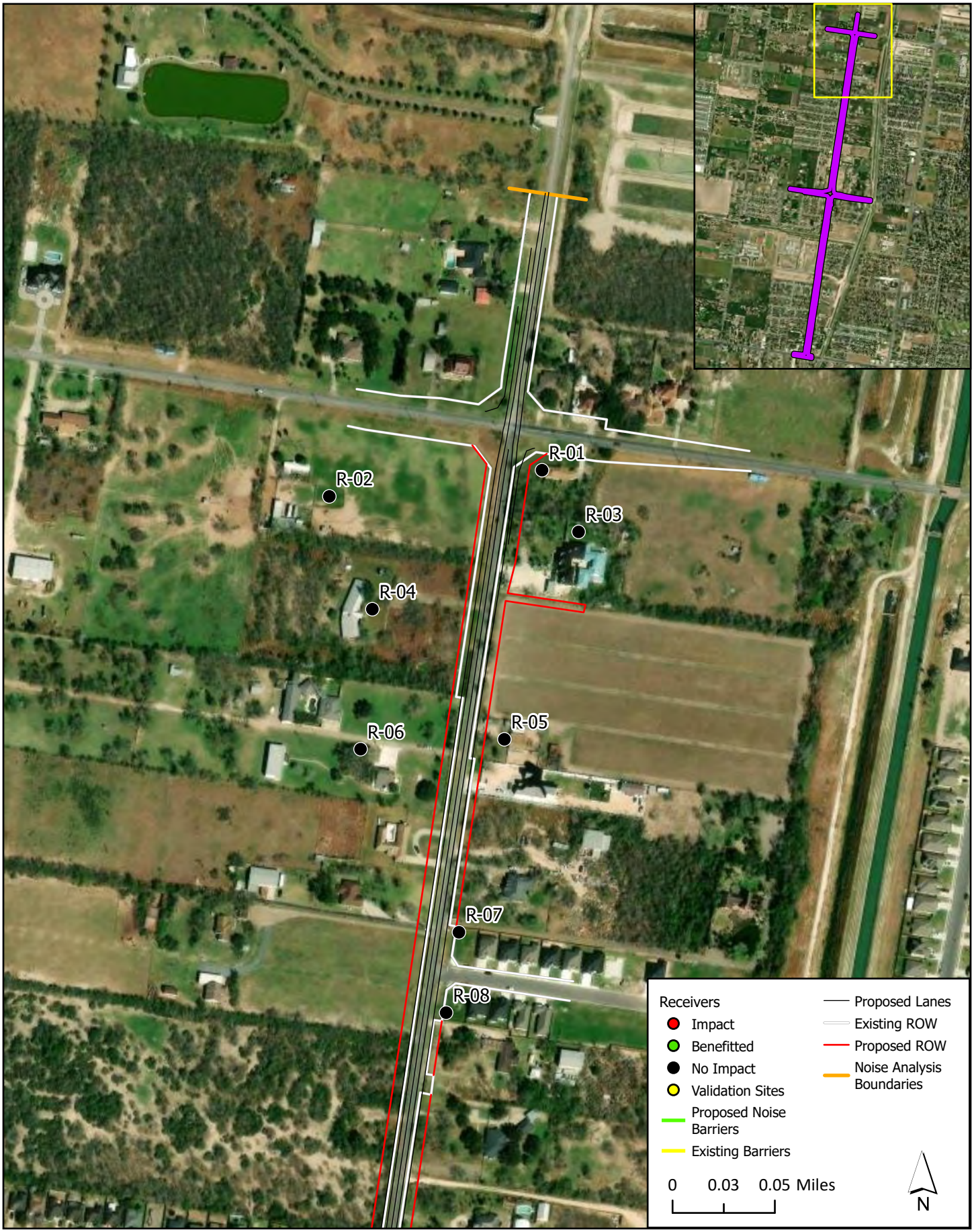
A copy of this traffic noise analysis will be available to local officials. On the date of the environmental decision for this project (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

List of Attachments

A. Map figures

B. Traffic data

C. Existing model validation study



SOURCE: World Imagery: Maxar, Microsoft
World Imagery: Maxar

BENEFITTED RECEIVERS AND PROPOSED NOISE BARRIERS

Bentsen Road Widening
Traffic Noise Analysis
McAllen, Hidalgo County, Texas
CSJ 0921-02-512

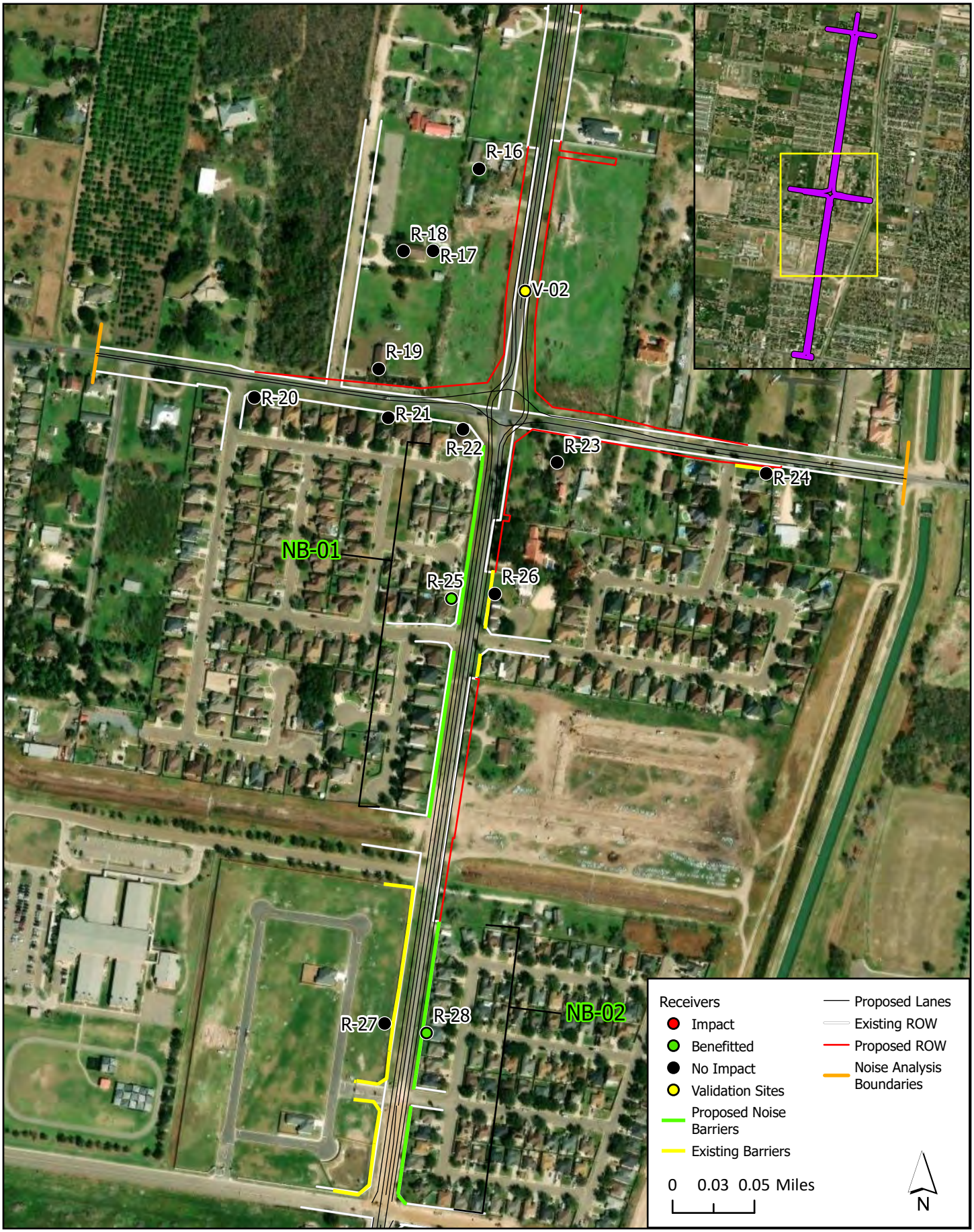
FIGURE 1A

SOURCE: World Imagery: Earthstar Geographics
World Imagery: Maxar

BENEFITTED RECEIVERS AND PROPOSED NOISE BARRIERS

Bentsen Road Widening
Traffic Noise Analysis
McAllen, Hidalgo County, Texas
CSJ 0921-02-512

FIGURE 1B

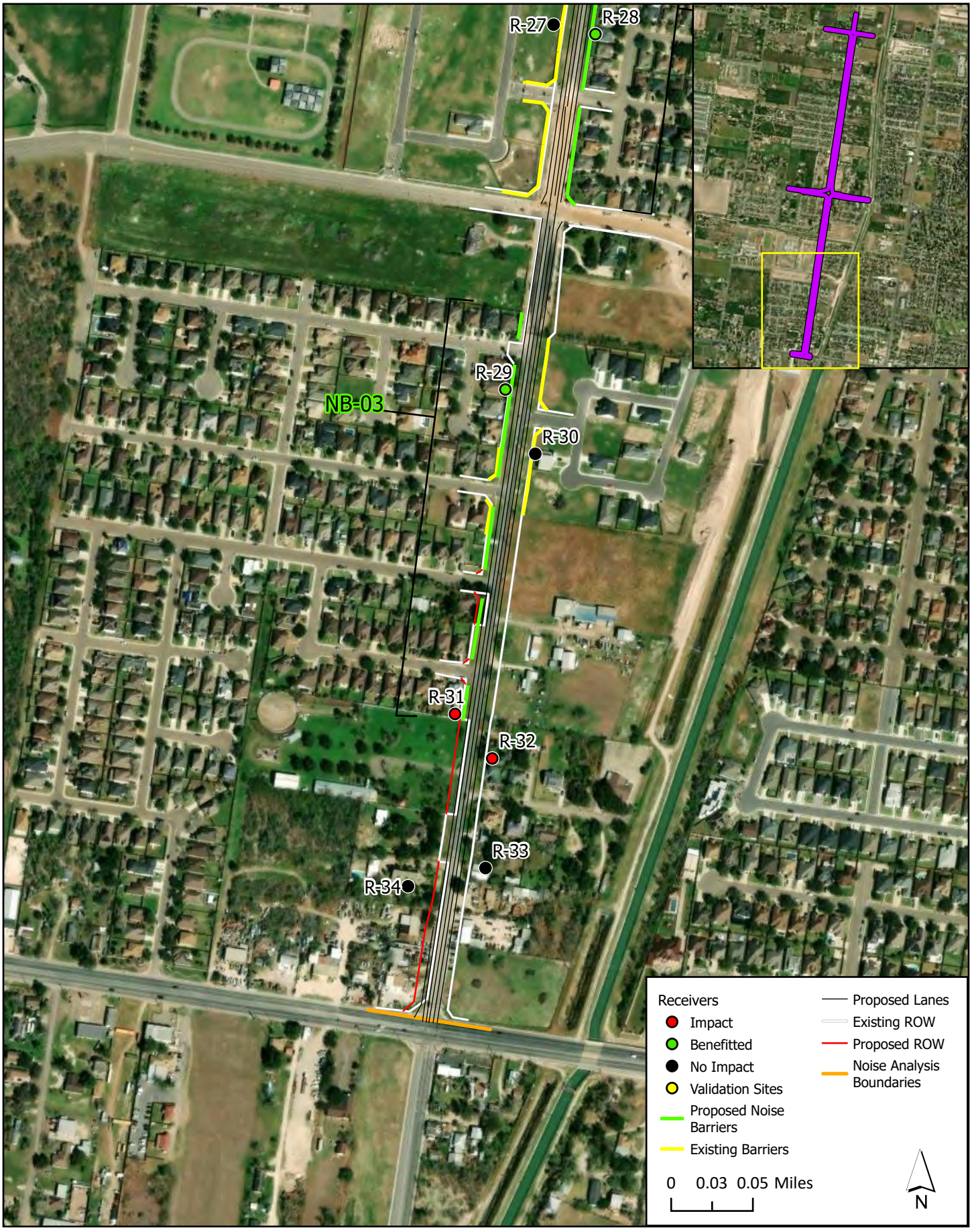


SOURCE: World Imagery: Maxar

BENEFITTED RECEIVERS AND PROPOSED NOISE BARRIERS

Bentsen Road Widening
Traffic Noise Analysis
McAllen, Hidalgo County, Texas
CSJ 0921-02-512

FIGURE 1C



SOURCE: World Imagery: Maxar

BENEFITTED RECEIVERS AND PROPOSED NOISE BARRIERS

Bentsen Road Widening
Traffic Noise Analysis
McAllen, Hidalgo County, Texas
CSJ 0921-02-512

FIGURE 1D

Docusign Envelope ID: 9EF96D38-CE65-4710-86E3-AED955707404

Texas Department of Transportation

MEMO

July 24, 2024

To: Pedro R. Alvarez, P.E., District Engineer
Attention: Norma Y. Garza, P.E., Director of TPD

Through: Janie Temple
Transportation Analysis Branch Manager, TPP

DocuSigned by:
Janie Temple
680F90E65D6447B...

From: James Burnett
Planner, TPP

Subject: Traffic Data
CSJ: 0921-02-512
Bentsen Road:
From 5 Mile Road (Auburn Avenue)
To 3 Mile Road (FM 1924/Buddy Owens Boulevard)
Lark Avenue:
From Bentsen Road
To Taylor Road
North Taylor Road:
From Daffodil Avenue (2 Mile Line Road)
To Lark Avenue
Hidalgo County

Attached are tabulations showing traffic analysis for highway design for the 2028 to 2048 twenty-year period and the 2028 to 2058 thirty-year period for the described limits of the route. Included are tabulations showing data for use in air and noise analysis.

Due to differences in traffic volumes the Bentsen Road portion of this project was separated into two sections:

Section 1: From 5 Mile Road (Auburn Avenue) to Lark Avenue
Section 2: From Lark Avenue to 3 Mile Road (FM 1924/Buddy Owens Boulevard)

Due to differences in traffic volumes the Taylor Road portion of this project was separated into two sections:

Section 1: From Daffodil Avenue (2 Mile Line Road) to Buddy Owens Boulevard (FM 1924/3 Mile Road)
Section 2: From Buddy Owens Boulevard (FM 1924/3 Mile Road) to Lark Avenue

Please refer to your original request dated July 8, 2024.

Docusign Envelope ID: 9EF96D38-CE65-4710-86E3-AED955707404

If you have any questions or need additional information, please contact James Burnett at (512) 486-5165.

Attachments

cc: Sergio Cantu, P.E.
Transportation Engineer Supvr, Pharr District
Design Division

Docusign Envelope ID: 9EF96D38-CE65-4710-86E3-AED955707404

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Pharr District **July 18, 2024**

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2048	Open To Traffic Year: Dir Dist %	Open To Traffic Year: K Factor	Open To Traffic Year: Percent Trucks ADT	Open To Traffic Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2028 to 2048): Flexible Pavement	S N	Rigid Pavement	SLAB
Bentsen Road Section 1 From 5 mile Road (Auburn Avenue) To Lark Avenue Hidalgo County	4,800	7,100	61 - 39	10.8	3.4	2.6	10,000	30	387,500	3	406,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Open To Traffic Year % of ADT	Open To Traffic Year % of DHV
Light Duty	96.6	97.4
Medium Duty	2.8	2.1
Heavy Duty	0.6	0.5

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2058	Open To Traffic Year: Dir Dist %	Open To Traffic Year: K Factor	Open To Traffic Year: Percent Trucks ADT	Open To Traffic Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2028 to 2058): Flexible Pavement	S N	Rigid Pavement	SLAB
Bentsen Road Section 1 From 5 mile Road (Auburn Avenue) To Lark Avenue Hidalgo County	4,800	7,900	61 - 39	10.8	3.4	2.6	10,000	30	620,500	3	650,000	8"

Docusign Envelope ID: 9EF96D38-CE65-4710-86E3-AED955707404

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Pharr District **July 18, 2024**

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2048	Open To Traffic Year: Dir Dist %	Open To Traffic Year: K Factor	Open To Traffic Year: Percent Trucks ADT	Open To Traffic Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2028 to 2048): Flexible Pavement	S N	Rigid Pavement	SLAB
Bentsen Road Section 2 From Lark Avenue To 3 Mile Road (FM 1924/Buddy Owens Boulevard) Hidalgo County	8,400	12,300	61 - 39	10.8	3.1	2.3	10,300	30	617,000	3	645,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Open To Traffic Year % of ADT	Open To Traffic Year % of DHV
Light Duty	96.9	97.7
Medium Duty	2.6	2.0
Heavy Duty	0.5	0.3

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2058	Open To Traffic Year: Dir Dist %	Open To Traffic Year: K Factor	Open To Traffic Year: Percent Trucks ADT	Open To Traffic Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2028 to 2058): Flexible Pavement	S N	Rigid Pavement	SLAB
Bentsen Road Section 2 From Lark Avenue To 3 Mile Road (FM 1924/Buddy Owens Boulevard) Hidalgo County	8,400	13,800	61 - 39	10.8	3.1	2.3	10,400	30	992,500	3	1,038,000	8"

Docusign Envelope ID: 9EF96D38-CE65-4710-86E3-AED955707404

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Pharr District **July 18, 2024**

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2048	Open To Traffic Year: Dir Dist %	Open To Traffic Year: K Factor	Open To Traffic Year: Percent Trucks ADT	Open To Traffic Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2028 to 2048): Flexible Pavement	S N	Rigid Pavement	SLAB
Lark Avenue Limits From Bentsen Road To Taylor Road Hidalgo County	5,600	8,300	61 - 39	10.8	2.6	2.0	10,000	40	395,500	3	449,500	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Open To Traffic Year % of ADT	Open To Traffic Year % of DHV
Light Duty	97.4	98.0
Medium Duty	1.8	1.4
Heavy Duty	0.8	0.6

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2058	Open To Traffic Year: Dir Dist %	Open To Traffic Year: K Factor	Open To Traffic Year: Percent Trucks ADT	Open To Traffic Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2028 to 2058): Flexible Pavement	S N	Rigid Pavement	SLAB
Lark Avenue Limits From Bentsen Road To Taylor Road Hidalgo County	5,600	9,300	61 - 39	10.8	2.6	2.0	10,000	40	636,000	3	723,000	8"

Docusign Envelope ID: 9EF96D38-CE65-4710-86E3-AED955707404

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Pharr District **July 18, 2024**

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2048	Open To Traffic Year: Dir Dist %	Open To Traffic Year: K Factor	Open To Traffic Year: Percent Trucks ADT	Open To Traffic Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2028 to 2048): Flexible Pavement	S N	Rigid Pavement	SLAB
North Taylor Road Section 1 From Daffodil Avenue (2 Mile Line Road) To Buddy Owens Boulevard (FM 1924/3 Mile Road) Hidalgo County	7,300	10,800	61 - 39	10.8	3.5	2.6	10,300	30	612,000	3	641,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Open To Traffic Year: % of ADT	Open To Traffic Year: % of DHV
Light Duty	96.5	97.4
Medium Duty	2.9	2.2
Heavy Duty	0.6	0.4

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2058	Open To Traffic Year: Dir Dist %	Open To Traffic Year: K Factor	Open To Traffic Year: Percent Trucks ADT	Open To Traffic Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2028 to 2058): Flexible Pavement	S N	Rigid Pavement	SLAB
North Taylor Road Section 1 From Daffodil Avenue (2 Mile Line Road) To Buddy Owens Boulevard (FM 1924/3 Mile Road) Hidalgo County	7,300	12,100	61 - 39	10.8	3.5	2.6	10,400	30	984,000	3	1,031,000	8"

Docusign Envelope ID: 9EF96D38-CE65-4710-86E3-AED955707404

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Pharr District **July 18, 2024**

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2048	Open To Traffic Year: Dir Dist %	Open To Traffic Year: K Factor	Open To Traffic Year: Percent Trucks ADT	Open To Traffic Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2028 to 2048): Flexible Pavement	S N	Rigid Pavement	SLAB
North Taylor Road Section 2 From Buddy Owens Boulevard (FM 1924/3 Mile Road) To Lark Avenue Hidalgo County	4,400	6,500	61 - 39	10.8	3.3	2.5	10,000	30	345,000	3	361,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Open To Traffic Year % of ADT	Open To Traffic Year % of DHV
Light Duty	96.7	97.5
Medium Duty	2.8	2.1
Heavy Duty	0.5	0.4

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2058	Open To Traffic Year: Dir Dist %	Open To Traffic Year: K Factor	Open To Traffic Year: Percent Trucks ADT	Open To Traffic Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2028 to 2058): Flexible Pavement	S N	Rigid Pavement	SLAB
North Taylor Road Section 2 From Buddy Owens Boulevard (FM 1924/3 Mile Road) To Lark Avenue Hidalgo County	4,400	7,300	61 - 39	10.8	3.3	2.5	10,000	30	555,500	3	581,500	8"

Existing Model Validation Study
Bentsen Road Widening
CSJ 0921-02-512

A validation study was performed in order to verify that the existing model accurately predicts existing traffic noise based on current conditions and to ensure that traffic noise is the main source of noise. Model validation compares field-collected sound level measurements to traffic noise levels calculated in an existing condition model that uses field-collected traffic parameters.

At all Validation Sites, a SoundPro SE/DL sound level meter was positioned on a tripod with the microphone positioned towards the roadway at a 70° angle and five feet from the ground. Each measurement duration was 15 minutes. The meter was calibrated before measurements were taken and at the end of the day. Concurrently with the sound level measurement, a DJI Phantom 4 Drone Camera was used to record traffic conditions for all existing travel lanes adjacent to the noise meter. Average traffic speeds were determined, using a Bushnell Velocity Speed Gun; traffic speeds were measured as cars were driving away from the sound level meter, as to not affect or reduce the speed of drivers.

Validation Site 1 (V-01) was conducted within the right-of-way of Bentsen Road, south of Swallow Avenue, shown in **Photo 1** and **Attachment A, Figure 1B**. Plantation Gap, a single-family residential neighborhood, is present west adjacent of V-01. During measurements, north- and southbound traffic was free-flowing at a constant speed. Field measurements were collected between 10:22 AM and 10:37 AM on July 14, 2025.

Validation Site 2 (V-02) was conducted within the right-of-way of Bentsen Road, north of Lark Avenue, shown in **Photo 2** and **Attachment A, Figure 1C**. Undeveloped lots and fallowed land are present west and east of V-02. During measurements, traffic was observed accelerating north and decelerating south to the all-way stop intersection of Bentsen Road and Lark Ave. Field measurements were collected between 11:15 AM and 11:30 AM on July 14, 2025.

Upon return from the field, field data were reviewed to obtain traffic counts by vehicle classification (car, medium truck, and heavy truck). Because the noise modeling software uses a vehicle per hour input, vehicle counts for the 15 minute measurement interval were multiplied by four to convert the values to the hourly condition.

The Federal Highway Administration (FHWA) traffic noise modeling software (TNM 2.5) was used to calculate existing traffic noise levels at the validation location, based on the field-observed conditions. The validation model runs used the existing roadway parameters, observed hourly traffic counts, and observed speeds.

The existing conditions along Bentsen Road between Auburn Avenue and Buddy Owens Boulevard were modeled as free flow lanes with traffic controls at major intersections. This model was validated at V-01 and V-02, shown in **Table 1**.

Field notes are shown in **Table 2** and **3**.

Table 1. Traffic Noise Model Validation

Validation Site	Field-Measured Level dB(A) Leq	Modeled Level dB(A) Leq	Difference (+/-)	Validated?
V-01 – Bentsen Road	64.3	61.6	+2.7	Yes
V-02 – Bentsen Road	67.3	67.1	+0.2	Yes

Differences between the measured and model-calculated sound levels were within the +/- 3 Db(A) tolerance allowed by FHWA. Therefore, the existing noise model is considered validated for this project.

Table 2. Site 1 - Traffic Validation Summary and Field Notes

Existing TNM Validation Study	
Validation Site	V-01
Project Name	Bentsen Road
CSJ	0921-02-512
County	Hidalgo County
Date of Study	07/14/2025
Start Time	10:22 AM
End Time	10:37 AM
Duration	15 minutes
Dosimeter	SoundPro SE/DL
Traffic Counting	DJI Phantom 4 Drone
Location	South of Bentsen Road & Swallow Avenue – Sidewalk and curb between Bentsen Road and backyards of west adjacent residential neighborhood.
Weather	Cloudy
Temperature	87°F
Wind Speed and Direction	4 mph, S
Notes	Traffic is free-flow north to south. Other observed noises observed include birds and cicadas; position was adjusted along residential neighborhood to avoid barking dogs.

Photo 1. View of V-01, facing north.

Table 3. Site 2 - Traffic Validation Summary and Field Notes

Existing TNM Validation Study	
Validation Site	V-02
Project Name	Bentsen Road
CSJ	0921-02-512
County	Hidalgo County
Date of Study	07/14/2025
Start Time	11:15 AM
End Time	11:30 AM
Duration	15 minutes
Dosimeter	SoundPro SE/DL
Traffic Counting	DJI Phantom 4 Drone
Location	North of Bentsen Road & Lark Avenue – Right-of-way east Bentsen Road.
Weather	Cloudy
Temperature	87°F
Wind Speed and Direction	4 mph, S
Notes	Traffic is accelerating north and decelerating south to the all-way stop intersection.

Photo 2. View of V-02, facing south.